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10/059,572	01/28/2002	Joseph J. Stevens	5840.03/CPI/COPPER/PJS	7921
32588	7590	12/30/2003	EXAMINER	
APPLIED MATERIALS, INC.			MOORE, KARLA A	
2881 SCOTT BLVD. M/S 2061			ART UNIT	
SANTA CLARA, CA 95050			PAPER NUMBER	

1763

DATE MAILED: 12/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/059,572

Applicant(s)

STEVENS ET AL.

Examiner

Karla Moore

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE \_\_\_\_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on 10/06/03.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 19,20,22-27,32-40 and 96-99 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 19,20,22-27, 32-40 and 96-97 is/are rejected.
- 7) ☒ Claim(s) 98 and 99 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 January 2002 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_. 6) ☐ Other: \_\_\_\_\_

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## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election of Group II in a paper received 10/06/03 is acknowledged. . Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
4. Claims 19-20, 22-25 and 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,557,785 to Ohkuma.
5. Ohkuma discloses a substrate processing apparatus in Figure 3A, comprising: an evaporation shield (cover, 12) adapted to be positioned over a substrate (14) disposed on a substrate support (pedestal, 11) and fluid filled area between pedestal and substrate; column 3, rows 5-9).
6. However, Ohkuma fails to teach a specific thickness of the gap, such as between about 0.5 mm and 4mm.

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7. The courts have ruled that where the general conditions of a claim are disclosed in the prior art, such as in Ohkuma it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

8. With respect to claim 20, the shield is sized to substantially cover the substrate (see Figure 3A).

9. With respect to claim 22, the evaporation shield comprises a fluid-retaining surface (bottom surface of the cover) adapted to form a fluid filled gap with respect to the substrate (column 4, rows 26-31). The gap is filled with a fluid layer.

10. With respect to claim 23, the shield further comprises at least one port (opening, 20; column 3, rows 53-56) to deliver a fluid to form the fluid layer.

11. With respect to claim 24 and 25, the evaporation shield further comprises at least one port (exhaust opening 21; column 3, rows 57-66) to reclaim the fluid on the substrate.

12. With respect to claims 35 and 36, a seal (o-ring, 22; column 3, rows 44-45) is provided contacting both the substrate support and the evaporating shield for forming a sealed chamber.

13. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,557,785 to Ohkuma. in view of U.S. Patent No. 4,821,675 to Ikeno et al.

14. Ohkuma discloses a substrate processing apparatus substantially as claimed in Figure 3A and comprising: a movable evaporation shield (cover, 12) adapted to be positioned over a substrate (14) disposed on a substrate support (pedestal 11) and sized to substantially cover the substrate, the evaporation shield having a fluid retaining surface adapted to form a gap with respect to the substrate, wherein the gap is adapted to be filled with a fluid layer (column 3, rows 5-9).

15. However, Ohkuma fails to teach the evaporation shield/cover adapted to provide heat to the fluid layer.

16. Ikeno et al. teach the use of an evaporation shield/cover/lid adapted to provide heat to a fluid layer in a substrate processing apparatus for the purpose of restraining temperature variation of the fluid (column 2, rows 40-43 and column 2, rows 65-column 3, row 2).

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17. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an evaporation shield/cover/lid adapted to provide heat to a fluid layer in a substrate processing apparatus in Ohkuma in order to restrain temperature variation of the fluid as taught by Ikeno et al.

18. Examiner notes that both the cover of Ohkuma and the cover of Ikeno et al. are considered to be "movable", in that they are able to move between a closed and open position for accessing each of the chambers.

19. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohkuma as applied to claims 19-20, 22-25 and 35-36 above, and further in view of German Patent No. 29922090U1 to Sotralentz.

20. Ohkuma discloses the invention substantially as claimed and as described above.

21. However, Ohkuma fails to teach the evaporation shield comprising a degassing membrane.

22. Sotralentz teaches the use of a degassing membrane provided in a container top (Figures 1-2 and abstract) for the purpose of provide a container capable of simple and effective degassing.

23. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an evaporation shield comprising a degassing membrane in Ohkuma in order to provide a container capable of simple and effective degassing as taught by Sotralentz.

24. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,557,785 to Ohkuma. in view of U.S. Patent No. 4,120,699 to Kennedy, Jr. et al.

15. Ohkuma discloses a substrate processing apparatus substantially as claimed in Figure 3A and comprising: an evaporation shield (cover, 12) adapted to be positioned over a substrate (14) disposed on a substrate support (pedestal, 11) and having a fluid retaining surface adapted to form a gap with respect to the substrate, wherein the gap is adapted to be filled with a fluid layer (column 3, rows 5-9).

25. However, Ohkuma fails to teach a transducer coupled to/disposed against the evaporation shield to provide acoustic waves to the fluid layer.

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26. Kennedy, Jr. et al. teach the use of a plurality of transducers (Figure 3, 26, 28 and 30) spaced about the walls of a chamber (including the top) for the purpose of causing acoustic waves with constructive interference that sweeps over a substrate to be processed and results in needing a shorter period of time for cleaning a substrate with an irregular surface (column 4, rows 4-32).

27. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a transducer coupled to an evaporation shield/top of chamber in Ohkuma in order to cause acoustic waves with constructive interference that sweep over a substrate to be processed and result in the need for a shorter period of time to clean a substrate with an irregular surface as taught by Kennedy, Jr. et al.

28. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohkuma and Kennedy, Jr. et al. as applied to claims 32 and 33 above, and further in view of U.S. Patent No. 6,224,713 to Hembree et al.

29. Ohkuma and Kennedy, Jr. et al. disclose the invention substantially as claimed and as described above.

30. However, Ohkuma and Kennedy, Jr. et al. fail to disclose the transducer comprising a rod which is adapted to contact a fluid layer.

31. Hembree et al. teach mounting a transducer (Figure 5, 28) on a submersible rod (34) to transmit energy from the transducer to a processing solution for the purpose of preventing the need to bring the transducer in direct contact with the solution (column 5, rows 49-53).

32. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a submersible rod for mounting a transducer in Ohkuma and Kennedy, Jr. et al. in order to prevent the need for bringing the transducer in direct contact with a processing solution as taught by Hembree et al.

33. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,557,785 to Ohkuma. in view of U.S. Patent No. 5,906,860 to Motoda et al.

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16. Ohkuma discloses a substrate processing apparatus substantially as claimed in Figure 3A and comprising: an evaporation shield (cover, 12) adapted to be positioned over a substrate (14) disposed on a substrate support (pedestal, 11).

34. However, Ohkuma fails to teach the evaporation shield adapted to rotate independently of the substrate support.

35. Motoda et al. teaches rotation of a lid and cup separate from a rotation of a substrate support for the purpose permitting efficient rotating of a spin chuck and improved throughput and product yield (column 1, row 44 through column 2, row 3 and column 6, rows 57-67, also see Figures 8A-8E).

36. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided separate rotation for a lid/cup combination and substrate support in Ohkuma in order to permit efficient rotation of a spin chuck and improved throughput and product yield as taught by Motoda et al.

37. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohkuma as applied to claims 19-20, 22-25 and 35-36 above, and further in view of U.S. Patent No. 5,316,591 to Chao et al.

38. Ohkuma discloses the invention substantially as claimed and as described above.

39. However, Ohkuma fails to teach the apparatus comprising fluid agitation components selected from the group consisting of channels, veins and protrusions, the fluid agitation components being disposed on a bottom surface of the evaporation shield.

40. Chao et al. teaches the use of a fluid agitation component (Figure 1, multiple part numbers, 16, 18, 20) disposed on a bottom surface of the evaporation shield for the purpose of providing cavitation-producing means which remove undesired material from a substrate (abstract).

41. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a fluid agitation component disposed on the bottom surface of Ohkuma in order to provide cavitation-producing means that remove undesired material from a substrate as taught by Chao et al.

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42. Claims 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohkuma as applied to claims 19-20, 22-25 and 35-36 above, and further in view of U.S. Patent No. 3,853,094 to Christini et al.

43. Ohkuma discloses the invention substantially as claimed and as described above.

44. However, Ohkuma fails to teach the evaporation shield comprising polymeric material.

45. Christini et al. teach using a polymeric material when constructing a processing apparatus to take advantage of the corrosion resistance properties of polymers (column 7, rows 37-42).

46. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided the evaporation shield comprising polymeric material in Ohkuma in order to take advantage of the materials anti-corrosion properties as taught by Christini et al.

47. Claims 96 and 97 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,557,785 to Ohkuma in view of German Patent No. 29922090U1 to Sotralentz.

48. Ohkuma discloses a substrate processing apparatus in Figure 3A substantially as claimed comprising: an evaporation shield (cover, 12) adapted to be positioned over a substrate (14) disposed on a substrate support (pedestal, 11). Ohkuma discloses the invention substantially as claimed and as described above.

49. However, Ohkuma fails to teach the evaporation shield comprising a degassing membrane and a plenum in communication with the degassing membrane or a plenum port coupled to the plenum.

50. Sotralentz teaches the use of a degassing membrane provided in a container top (6, Figures 1-2 and abstract) for the purpose of provide a container capable of simple and effective degassing. The device further comprises a plenum (area between 6 and 7) and plenum port (8) coupled to the plenum.

51. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an evaporation shield comprising a degassing membrane in Ohkuma in order to provide a container capable of simple and effective degassing as taught by Sotralentz.



***Allowable Subject Matter***

52. Claims 98 and 99 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

53. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record fails to teach or fairly suggest a vacuum/low partial pressure source coupled to the plenum port of the apparatus. Nor does any other piece of art provide motivation for combination of this feature with the prior art of record.

***Response to Arguments***

54. Applicant's arguments filed 10/06/03, with respect to the use of the Ohkuma reference, have been fully considered but they are not persuasive. As noted above, Applicant's amendment and arguments rely upon optimization of a parameter that is known processing variable. The courts have ruled that this sort of experimentation is not inventive.

55. Applicant's arguments filed 10/06/03, with respect to the use of the Ikeno et al. reference and movement of the lid, have been fully considered but they are not persuasive. As noted above, the lid of Ikeno et al. is "moveable".

56. Applicant's arguments, filed 10/06/03, with respect to the rejection(s) of claim(s) 27 using the Ohmi et al. reference have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Sotralentz.

57. Applicant's arguments, filed 10/06/03, with respect to the rejection(s) of claim(s) 32, 33 and 38 using the Rothman et al. reference have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Kennedy, Jr. et al. or Chao et al.

58. Applicant's arguments with respect to claim 37 have been considered but are moot in view of the new ground(s) of rejection.

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**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 571.272.1440. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703.308.1633. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

km  
18 December 2003

  
Parviz Hassanzadeh  
Primary Examiner  
Art Unit 1763